AN ESSAY ON VITAL SUSPENSION:

BEING AN ATTEMPT TO INVESTIGATE AND TO ASCERTAIN THOSE DISEASES, IN WHICH THE PRINCIPLES OF LIFE ARE APPARENTLY EXTINGUISHED.

"ET REFELLERE SINE PERTINACIA ET REFELLI
"SINE IRACUNDIA PARATI SUMUS."
CICERO.

BY A
MEDICAL PRACTITIONER.

LONDON:
PRINTED FOR RIVINGTON AND SONS, ST. PAUL'S CHURCH-YARD.
M DCC XLI.

WELLCOME
LIBRARY
INSTITUTE

[1791]
Wall. iv. (Supplement)
Collation. xxii. p. 181

THIS

TRACT

ON

VITAL SUSPENSION,

IS MOST RESPECTFULLY

INSCRIBED AND DEDICATED

TO

DR. HAWES,

BY

THE AUTHOR.

A

TREATISE

ON

VITAL SUSPENSION.

> Quam pulchrum eſt! in principiis, in origine rerum
> Defixiſſe oculos & nobile mentis acumen.
> Provolat huc ſapiens.——
>
> LUCR.

CAP I.

An attempt to give a definition conſonant to nature and fact of this diſeaſe.——The errors into which Profeſſor CULLEN, *and other Illuſtrious Writers have fallen, in aſſigning the true place in Noſology of this malady, demonſtrated and refuted.*

WHAT rank in Noſology ſhould be aſſigned to that malady of the body, when it exhibits all the ſemblances of death, is extremely difficult to determine, nor is this difficulty a matter of aſtoniſhment; the reaſon is obvious: to be competent to the definition and diviſion of any ſubject, we muſt have a complete and perfect knowledge of it.

Lanciſi's

Lanciſi's claſſification of all caſes of ſudden ſuſpenſion of the vital vires under one genus, diſtinguiſhed by the term, *morbi attoniti*, ſeems to be founded in an agreement with facts: his reſolution of this genus into its ſpecies does not appear to be equally conſentaneous to phyſical truth.

If we reſolve it into four ſpecies, as the brain, the ventricle, the heart, or lungs, may be primarily affected; this diviſion may lead to no error in practice, but will be diſcovered on inveſtigation to be a mere fiction of the fancy: for governed by the ſame principle, we muſt eſtabliſh the number of ſpecies, comprehended under every genus, equal to that of the cauſes, which produce any variety therein: that theſe cauſes are infinite, is unqueſtionable.

That caſe of ASPHYXIA, which takes place, ſubſequent to any muſcle being affected, is equally intitled to be conſidered of a diſtinct ſpecies, as that, which follows the thorax or the ventricle being affected. The illuſtrious Lanciſi confeſſes, that the Apoplexia of the brain, the Syncope of the heart, and the Suffocatio of the lungs, are often inſuſceptible of diſcrimination; further, he not only admits, but even contends, that the ſame cauſe operating in the ſame way, is adequate to the producing of all thoſe affections united, or any of them.

All phyſical writers, ſo far as our acquaintance extends, have, without any heſitation, diſtinguiſhed Apoplexia and Syncope by certain diagnoſtica. Were we to aſſume theſe, as our criteria in the judging of the laſt mentioned affections, we ſhould be induced to conclude, not merely, that there was a difference, but that there was a *totâ naturâ* oppoſition between them. Again, if we ſuppoſe the diſtinction of theſe two affections to be effectuated, with ſuch eaſe, as the multitude of writers infer, how are we to reconcile therewith, the diſagreements of the medical ſyſtem framers, reſpecting the claſſes, to which thoſe diſeaſes ſhould be referred, and conſequently, reſpecting their nature or true diſtinctions.

The vital or involuntary inſtruments, do not ſeem to act ſo conſtantly in Apoplexia as the Faculty ſuppoſe. In the ſixth, ſeventh, and ninth ſpecies, laid down by the illuſtrious Cullen, the venenata, mentalis, and ſuffocata, unleſs I be much deceived, the action of the breath and heart rarely accompany the diſeaſe. Which ſpecies, for aught I can diſcern, comprehend as many caſes, as all the reſt beſides. Junker, ſpeaking of the Apoplexia fortior, has theſe words, "In the laſt ſtage the vital motion and the ſenſation are almoſt extinguiſhed."

Nor is, the ceſſation or diminution, in any conſiderable degree, of the pulſes, an inſeparable concomitant upon Syncope. That truly ingenious phyſician Whytt, had a ſick woman under his care, upon receiving intelligence of her huſband's death, ſhe fell into a ſyncope, wherein ſhe remained fifteen minutes, during which time ſhe betrayed all the appearances of death. Cel Sauvages, in his deſcription of Leipothymia, which is only another name for Syncope, ſays, "The pulſe generally remains uninjured."

Cullen ſays, "in Apoplexia, the brain, in Syncope, the heart is firſt affected;" reſting on this aſſumption, he has undertaken to eſtabliſh various caſes of Aſphyxia: but what axiom or poſtulate does natural or medical philoſophy afford, which can furniſh a ſolution of ſo extaordinary an operation, as that by which diſagreeable ſenſations or affections of the mind muſt produce any malady, that makes its firſt attack upon the heart; that ſuch, however, are amongſt the moſt frequent cauſes of Syncope, is a fact well known to every man converſant with phyſical ſcience.

The Philoſophical Tranſactions, vol. 69, give an account of a man, who having raſhly and unknowingly inſpired ſome inflammable air, was attacked with all the ſymptoms peculiar to Syncope. Nowithſtanding which, guided by that venerableChief of phyſic, we ſhould refer this diſeaſe to Apoplexia.

All the ſymptoms of that peculiar diſeaſe, under which the body labours, when in an apparent ſtate of diſſolution, ſeem to correſpond in every circumſtance *cujusvis momenti*, with that uſually deſcribed, under the title of *Syncope*. That this laſt agrees with that, which is the conſequence of ſtrangling, is demonſtrable from reaſon, experience, and authority; although a numerous hoſt of diſtinguiſhed phyſical names, as Cullen, Boerhaave, Albert, Litzens, Wepſer, Bruhere, &c. have referred it to Apoplexia.

Sudden and immoderate joy is ſaid to produce Syncope, a vehement electrical ſhock, Apoplexia.

Do not theſe cauſes act in the ſame way? Who hath ever even attempted to point out a difference in the *modus operandi* of theſe cauſes? Do not both produce their effects by exceſſive incitation? Dr. Prieſtley's experiments inform us, that, in an electrical ſhock of the brain, the texture of that organ does not undergo any change, that is perceptible to ſenſe

What we have advanced in the preceding part, will, we preſume, ſufficiently juſtify us in neither referring the diſeaſe, which is the ſubject of this treatiſe, to the *ſyncope occaſionalis*, nor to the *apoplexia ſuffocata* of the great Cullen. From thoſe proofs we have adduced, we are conducted to this ſimple, clear, and obvious inference; that there are certain maladies proceeding from poiſons, noxious vapours, ſtrangling, drowning, which, in the courſe of nature, are provided to fill up that ſpace, which intervenes between the *caſus exquiſiti* of Syncope and Apoplexia, and that all theſe form, as it were, one great ſhade, the parts of which do not differ in kind or genus, but only in mode and magnitude.

In profeſſing therefore to treat of the ASPHYXIA *of the Drowned*, if our obſervations on this very intereſting ſubject carry any weight with them, or ſhall be found to have any coincidence with the *exemplar naturæ*, they may be eaſily extended to embrace all the varieties nearly of the genus.

Theſe various affections ought not however to be treated in a ſimilar mode, nor with the ſame remedies. He, who is ſtruck by lightning, and he, who is benumbed by cold, labour under diſorders, that are perfectly ſimilar in effect, each ariſes from debilitation, each conſiſts in the diminution of the vital and animal vires. The ſole difference is, one proceeds from exceſs of incitation, the other from powers, that are properly debilitating. We ſee in animals, that are killed by inflammable air, electricity and other powers exceſſively ſtimulant, the muſcles and all the limbs become flaccid.

The mode of deſtroying the effect muſt neceſſarily vary with the cauſe, nor is it repugnant to the idea of one genus comprehending them, that the parts conſtituting it require different, nay oppoſite remedies. — Whoever undertook to divide and ſubdivide diſeaſes according to the variation of the means of cure, Phyſic is unacquainted with the *methodus felix una* of removing Syncope and Apoplexia.

CAP II.

An inquiry into the prognoſtica of this malady.

THE judgment of the prognoſis, or event of this malady, conſiſts almoſt entirely in being able to draw the line, that ſeparates life and death; and to mark the preciſe limits of either, we need here hardly remind our readers, who are in the leaſt converſant with the ſubject, that the *celebriora nomina* of the medical art have owned, this moſt important, and if ſolved, deciſive queſtion in Phyſic, is wrapped in ſhades of almoſt impenetrable darkneſs; the greater indulgence will therefore, we truſt, be beſtowed on this our humble attempt to looſe this gordian knot of medical ſcience.

LIFE bears the ſame reſpect to death, that light does to darkneſs. Whatever can be demonſtrated to be eſſential to one, the oppoſite muſt be eſſential to the other; therefore, there can be no more certain method of inveſtigating the nature of death, than by conſidering what are the inherent properties of life.

There is no word, to which a more ambiguous, vague, and indefinite meaning is annexed, than to life; few have aſcertained, in their own minds, any clear, poſitive, or diſtinct idea of it; to enumerate and animadvert on the different definitions given by various authors would be totally foreign from the point we have in view. But previous to our proceeding further, we muſt aſſume two *conceſſa*, which, we believe, are indiſputable; the firſt is, that all bodies in nature are *aut viva aut mortua*, there being *no intermediate ſtate*. The ſecond is, that it muſt be a work *ſummam artem humanam ſuperans*, to recall to vital exiſtence that which is dead.

Theſe premiſes admitted, it follows, as a manifeſt conſequence from the properties, we have determined peculiar to this and other diſeaſes incidental to the human body, and ſtill more fully from the hiſtory of the *animalia hybernantia*, that life by no means conſiſts in the actions of the heart and the conſequent motion of the blood.

The ſame principles and the ſame ſeries of reaſoning muſt demonſtrate, that life is neither attached to ſenſation, nor to the breath inhaled and exhaled; nor to any other function; and therefore every ſign of death drawn from the extinction of any of theſe actions may not only be fallacious, and untrue; but may be attended with the moſt deleterious and pernicious effects to the human race.

Zoology affords us no property operating more univerſally, or more conſtantly in animated nature, than that of all living beings producing certain motions and efforts on the application of thoſe powers to them, which are, by a metaphor, termed STIMULATIVES; nor are theſe motions to be explained on any principles of mechaniſm—they are totally irreconcileable with them. This faculty of receiving the action of ſtimulatives, which diſcriminates animate from inanimate matter, and appears to us to conſtitute life, is retained with much greater tenacity by the muſcular fibres, than the nerves; to determine therefore whether life ſtill remain or not, let various ſtimuli be applied to a denudated muſcle; and by the degree of contraction, it may be collected, how far there is any life remaining.

Nor are we to conclude the life to be departed, however we may perceive no effects of the ſtimulants; reaſon as well as obſervation concur in aſſuring us of the inſufficiency of the teſtimony of our own ſenſes to reſolve this queſtion. Many veſſels of animals and plants, it is well known, are endowed with the property of contracting themſelves in the higheſt degree; however we may be unable to aſcertain it by experiments.

Other parts of animals are endued with different degrees of the ſame faculty; the organs of life retain it longer than thoſe of the will; further, the experiments of Whytt and Haller teach that the interior is much larger than the exterior ſuperficies of the heart and arteries—Reaſoning from analogy, would not therefore the rectum or the uterus appear the more proper parts for ſtimulation? Sauvageſius ſays, "Diſtinguitur Aſphyxia hyſterica a morte, immiſſo "in vaginam digito—motus quidam uteri percipitur "admotis cantharidibus excitantur phlyctænæ in "hyſtericis, nullæ in cadaveribus."

WATER received into the lungs and ventricle, intimates the vital force to be almoſt exhauſted; yet nothing ſhould be more cautiouſly avoided, than the accepting of this, as an indubitable ſign of death.——Spume diſcharged from the mouth is a very dangerous ſymptom; yet Hippocrates was miſtaken, in pronouncing it, to be an unerring ſign of death.

From a variety of experiments, particularly thoſe made by the moſt ingenious Achard, a fellow of the Academy of Berlin, it appears, that fixed air kills with much more expedition and certainty, than inflammable, the dangers which animals ſuſtain by noxious vapours, are known to be in the exact ratio, wherein the vapours contaminate any given portion of pure air.

Various experiments, which we ourſelves have made on quadrupeds, a detail of which here would lead us beyond our limits, have led us to make an obſervation well worthy the attention of the practitioner; that younger animals undergo leſs danger from ſubmerſion, than thoſe that are older.

Experiments likewiſe made on birds as well as quadrupeds induce us to infer, that thoſe animals contaminate the pure air, ſooner, in proportion, as they are *majora aut minora natu*, and therefore, in conformity with the rule laid down by Achard, that the danger they undergo, is in the ratio of their age.

Hænius's experiments upon drowned and ſtrangled animals, compared with thoſe which have been made with noxious vapours in the dens of dogs, and elſewhere, prove the former to be much more deſtructive than the latter, but the latter are demonſtrated much ſooner to effectuate, what is termed in Phyſic, *virium eclipſis.*

The experiments of Haleſius and Muſchenbroek upon the dead, and thoſe of Borelli upon the living body, have clearly evinced the far greater coheſion of the living, than the dead, fibres, a circumſtance, that hath excited the admiration of all Phyſiologiſts. This is the reaſon, alſo, that certain cavities, containing certain liquors for the uſe of the animal œconomy, after death, can no longer perform that office; the humors are diſſipated thro' the tunicæ, and the tunicæ become flaccid; this is particularly obſerved in the eyes; the appearances, theſe may exhibit, on cloſe inſpection, will furniſh a clear diagnoſtic between life and death.

A judicious perpenſion and proper application of theſe obſervations, will in general enable us to ſupply that great *deſideratum* in this important branch of medical philoſophy, to draw the line, that bounds life and death, and conſequently to diſcriminate ſuſpended from exhauſted animation. It is a proof of the temerity and imbecillity of human judgement; that we have too many inſtances on record, wherein even the moſt ſkilful phyſicians have erred in the deciſions they have pronounced, reſpecting the extinction of life, this ſhould incite the practitioner never to be deterred, *exemplo male pernicioſo*, in his efforts, *abditam dormientemque ſcintillulam explorare.*

C A P III.

An inveſtigation into the cauſes and their modus operandi in producing the ſymptoms.

Initiatos nos credimus et in ejus veſtibulo hæremus: illa arcana non promiſcue, non omnibus patent; reducto et interiori ſacrario clauſa ſunt—involuta veritas in alto latet.

THE opinions of men vary little on the ſubject of thoſe remote cauſes, which the ſenſes can take cognizance of; but when we come to inveſtigate their effects, to contemplate and compare them with the actions of the body, concerning the nature of which very few are agreed, our imagination begins to exert itſelf; thence raſhly adopted opinions are with difficulty maintained, and at laſt unable to

withſtand

withſtand the application of ſevere experiment and pure reaſoning, the ingenious and fancy laboured pile falls to the ground, and leaves not a veſtige behind. To theſe toils of the imagination, accumulating propoſition upon propoſition, to erect the ſyſtem, while the baſe is diſregarded, we may well ſay in the words of the poet,

> Tolluntur in altum
> Ut lapſu graviore ruant.

This eagerneſs of generalizing our reaſonings hath proved highly injurious to the intereſts of ſound philoſophy; to this ſource are to be traced the temerarious and haſty concluſions, which medical men, and indeed literary men in general, have, if we may be allowed the term, extorted from a few experiments; thus Becker, in his tract—*de ſubmerſorum morte ſine potu aquæ*, from having found no water in the lungs of two drowned men, contends, that it is never found, whilſt others, from a contrary principle, collect a different conſequence. The famous Littre ſuppoſed, that the diſorder ſprung from the admiſſion of water into the ventricle; Louis on the other hand in his treatiſe—*De l'incertitude des ſigns de la mort*, endeavoured to perſuade the French academy, that all the ſymptoms of the malady were occaſioned by the *dilatation* of the water in the *aſpera arteria.*

The hiſtory of theſe opinions ſeems to me a juſt image of the infirmity of the human underſtanding, let us admit for a moment, although it is by no means the fact, that in all caſes, the ventricle or the lungs are repleted. Yet we cannot from thence agree, that this is the principal circumſtance, much leſs the ſource of the ſymptoms manifeſted in the ſequel—but the truth is, they ſometimes receive the water, ſometimes do not, nor in either caſe are they obſerved to make any variation in the death, that enſues.

The *cauſa proxima* or *cauſa morbum continens* is a general debilitation of the ſyſtem, having its origin mediately or immediately in the brain, the true end and object, to which all remedies ſhould be directed, is to encreaſe the *vires* of the body—for vain and ineffectual muſt all our endeavours be, to impart motion to the ſtagnated humours, unleſs a *vis agendi* be previouſly communicated to the heart.

This cauſe, it is evident, equally agrees to every variety of the genus, to which this diſorder belongs; in thoſe caſes of Aſphyxia, which ariſe from cold, noxious vapours, and the like, the *cauſa proxima* ariſes out of the direct action of the exciting cauſes upon the nerves, the interceding conditions, by which it is immediately effected, in caſes of drowning or ſtrangling, are now to be conſidered.

Who in the preſent day can call in queſtion the efficacy of ſtimulating powers to reſuſcitate as well as to preſerve life, if this great præſidium of life, or even any conſiderable part of it, be ſubducted from us, we almoſt immediately become a maſs of inanimate matter; the circulating humours are adapted by their peculiar properties, their abundance and the nature of the ſuperficies they lave or waſh, to perform the office *maximi momenti:* in the ſeries or order of ſtimulants hence, not without reaſon, did the fanciful Helmont term the blood the balſam and treaſure of life.

If therefore, we ſhall be able to point out, in what manner the ſtimulus of this vital humour, or of its relative properties may be taken away or perverted; this aſcertained, the proximate cauſe will likewiſe be determined.

So ſoon as any terreſtrial animal is encompaſſed on every ſide by a liquidelement, the breath is intercepted, and the various actions that reſult therefrom, ceaſe; it is the buſineſs of the phyſiologiſt to inveſtigate the conſequences of the ceaſing of this function, by conſidering what are the utilities and advantages it brings to the ſyſtem, when operating freely; here indeed is opened *quaſi longe lateque patens campus:* we regret, that the object we propoſe to ourſelves, will not permit us to enter more deeply into a queſtion, whoſe momentous tendency hath engaged the attention of the moſt diſtinguiſhed philoſophers and phyſicians.

We ſhall aſſume as a datum, that the air in breathing poſſeſſes a double property, chemical and mechanical. Its chemical property produces certain qualities in the humours, whereby they are fitted or qualified to ſupport life with the aſſiſtance derived from the mechanical action of the air.

The abundance of circumfluent humours throughout the lungs far exceeds the ſuppoſed proportion of that viſcus; hence every obſtacle of circulation will be more dangerous in the ſame *ratio*. On the emiſſion of the breath, the veſſels of the lungs collapſe, and become complicated or interwoven; in order therefore to give the blood the freer tranſmiſſion, it is neceſſary, that all the fibres ſhould be ſtretched, all the veſſels extended; to perform this moſt important and momentous office, the organs of reſpiration have been provided by the all vigilant and all ſupplying diſpenſations of nature. While therefore the lungs are expanded, the blood flows freely, the *venæ cavæ* are emptied, the brain ſubſides, the contractions of the heart are accelerated. We ſhall explain a few experiments, to ſet our reaſoning in a fuller point of view, and to corroborate the juſtice of our concluſions; when the lungs are kept in a ſtate of expiration, the humours are injected into the veſſels with the utmoſt exertion of art, when they are inflated, the humours traverſe the veſſels with the greateſt facility. Where reſpiration is completely performed, the humours, although admitted in greater abundance than uſual, permeate the minuteſt veſſels.

The buſineſs of breathing being thus conſidered *a priori*, we hope we may be enabled to determine the conſequences, which muſt follow ſuffocation.

Firſt. The equiponderancy between the arteries, and the veins, is deſtroyed.

Secondly. The equiponderancy principally inclines to the latter, and therefore the veins of the brain and the ſinuſes are diſtended.

Thirdly. The ſtagnation of all the fluids gradually follows, and conſequently the diminution or deſtruction of the tone of the fibres; herein then muſt conſiſt the proximate cauſe.

Should it be objected, that the inciſions of dead bodies little ſupport our ſecond inference, yet the reaſons propoſed juſt above, reſting on fixed principles of phyſiology, evince, that the blood is accumulated in great abundance antecedent to death into the brains of the ſuſpended and drowned: and what other reaſon can be aſſigned of thoſe corruſcations of light, which thoſe, who have been brought back to life, have declared, they have beheld?

Why in the dead body no great quantity of blood is found accumulated, may be accounted for, on this ground: although there is a peculiar connexion between the heart and the lungs, and even a certain mechanical connexion, yet, upon the breath being altogether ſtopped, ſome motion of the blood has been often and clearly obſerved; if we credit Lower de Corde, Verheyen, and the ingenious Hunter.—— If, therefore, it be granted, that the veſſels of the lungs in a ſtate of expiration continue manifeſtly pervious, inaſmuch as the *cor dextrum* dies laſt, it follows that ſome of the venous blood muſt flow into the left ventrical, while that cannot propel the humour into the veins.

The annexed obſervation of the great Harvey demonſtrates, that after the death of drowned and ſtrangled animals, the blood flowing may be very much moved, and that the ſymptoms of diſeaſes are by no means always to be collected from the inciſion of dead bodies.

"I," ſays, our author "have pointed out in a body "recently ſtrangled, within two hours from the "ſuſpenſion thereof, the breaſt and pericardium being "opened, before the redneſs had quitted the viſage, "the right auricula of the heart and the lungs very "much diſtended and ſtuffed with blood, in the "preſence of many, but particularly the auricula, "of the ſize of the fiſt of a large man, ſo ſwelled, "that you would imagine it ready to burſt, which "bulk, the day following, the body having loſt all "its heat, and the blood having made a paſſage for "itſelf thro' other ways, hath entirely vaniſhed."

Another cauſe of death or exceſſive debility is, when the blood, which is admitted into the *cor ſiniſtrum* or *ſiniſtro-poſterior ventricle*, hath not undergone that change in the veſſels of the lungs, which renders it fit to ſuſtain life.

We ſhall now direct our endeavours to diſcover the cauſe of the very great fluidity obſervable in the maſs of blood in this diſeaſe. This hath not been touched upon by any writer; although it does not appear to be involved in any great difficulty.

That the air in its paſſage to the blood without the veſſels promotes the coagulation of it cannot be doubted; we ſhall not attempt to aſſign any reaſon of this, becauſe it ſuffices to our point, that the truth of the fact is determined by the coinciding teſtimony of accurate obſervers. Hæleſius, in his hæmaſtatics, and Prieſtley in his obſervations, have made it appear, that the thin membrane of the lungs does not ſuffice to prevent the reciprocal action of the air and the humors.

From theſe premiſes we may fairly infer, that the blood, which hath flown beyond the *pulmonalis circulus*, *cæteris paribus*, more readily coaleſces, than the blood, which hath not undergone the change there. Therefore the blood muſt neceſſarily become fluid and diſſolved in every caſe, where the breath is ſtopped, antecedent to the circulation, which agrees with obſervation; this concluſion is eſtabliſhed and confirmed by a hoſt of evidences, tho' the blood in the veins is leſs ready to coaleſce, than the blood in the arteries, although the latter is expoſed to a greater motion than the former.

The blood of the *venæ porta*, which is agitated in a third circle, is even leſs inclined to coaleſce, than that in the veins; the blood in drowſy animals remains in a thin and diſſolved ſtate all the winter, becauſe a circumfluxion is preſerved without reſpiration.

The remaining ſymptoms conſiſting in the privation of ſenſe, motion, heat, and the like and common to all maladies, that terminate in death, are too evident to obſervation, and too well known to require any expoſition here.

The renovated action of the heart depends on a primary law of nature; whereby it hath been provided that the copia, or abundance of the faculty we have above mentioned, as excluſively appropriated to animal nature, ſhould be directly oppoſite to the copia or abundance of ſtimuli acting upon it; or *aliis verbis*, the quantity of the former is in an inverſe proportion always to the quantity of the latter.

This is the reaſon, that, after the actions of the body have been ſome time ſuſpended, and the common ſtimuli withdrawn in ſome degree, this faculty ſhould by degrees increaſe; the remaining ſtimuli muſt conſequently reſtore the ſuſpended functions; ſo accurately conformable to truth and fact is the principle above laid down, that, if all the ſtimuli which operated, previous to the ſuſpenſion, were to be applied to this faculty now encreaſed to its utmoſt, life would be extinguiſhed, being deſtroyed in the ratio of the inverſe proportion.

But this faculty abounds in the heart and arteries in a much greater degree, than in any other part of the body; whence we are convinced, equally by reaſon and experience, that theſe organs are excited, before that the other organs of the body begin to act. The highly judicious and elegant reaſoning of Whytt on this ſubject has long demonſtrated, that the blood flowing in the arteries by its ſtimulative efficacy contracts the muſcles, that ſerve to reſpiration.

The preceding reaſonings might be eaſily extended to the actions of ſleeping animals upon their reſuſcitation, and to explain the ſource of reſpiration: but to attempt the diſcuſſion of this point, intereſting as it is, being not however relevant to our ſubject, would force us to tranſgreſs the limits we have marked to ourſelves.

CAP IV.

A comparative view of the different modes of RESUSCITATION, *With thoughts on* TRANSFUSION.

WE ſhall conclude with a few animadverſions on the modes of treatment and recovery of this diſeaſe. Every point of view, in which we can ſurvey it, teaches us, that a judicious adaptation of ſtimulatives forms the ſole cure; but herein the greateſt caution and prudence are required, as examples may occur, and ſuch have occurred, where the veſſels of the brain are preſſed with diſtenſion: powers, that are highly and rather roughly exciting, do not ſuit every caſe; and the utmoſt ſolicitude and care are demanded, upon the firſt appearance of returning life, to proportion the remedies to the preciſe degree of ſtrength manifeſted.

ELECTRICITY.

When the diſeaſe is general, it behoves us to adminiſter thoſe remedies, that are general in their operation upon the body; in ſuch a caſe, therefore, THOSE STIMULI are to be applied, which have the power of penetrating the *intimi receſſus* of the body, and are to be preferred to all others; nor is a great variety of them required, a few of the moſt powerful, that are at the ſame time eaſy to be adminiſtered, and reſtrained within due limits, will ſuffice. Such ſeem to be AIR, HEAT, and ELECTRICITY; of which the laſt is the moſt penetrative and the moſt eaſily moderated of all the aids, wherewith we are acquainted. If M. Abilgard was enabled by the judicious management of this one remedy to ſuſpend and reſtore the life of ſeveral animals merely *ad arbitrium*, what may we not hope from it?

AIR.

THE AIR is not only to be valued for its mechanical property of ſupporting the actions, that ariſe from the alternate motion of the thorax, but is likewiſe inveſted with a highly ſtimulative quality; hence advantages almoſt incredible have reſulted, in various caſes of ASPHYXIA, from a proper imitation of it by the breath.

VAPOURS, which have been proved by experience to be leaſt injurious to life, of volatile alkali; of moſchus, of camphor, or any other ſtimulative remedy, may be commixed with air applied to inflate the lungs.

There is a manifeſt connexion between the olfactory nerves, and the muſcles that ſerve to reſpiration; for which reaſon, the vapours ſhould be tranſmitted through the noſtrils, not the mouth.

HEAT.

The efficacy of heat in preſerving the ſymphony, and the neceſſity of it to defend animal life, are too well known for us to dwell on them; we ſhall make one obſervation thereon, being immediately relevant to our ſubject. If the heat, of the bath be more effectual, than the dry heat, its greater virtue we ſhould deem to ariſe from the ſudden diffuſion of the ſtimulus throughout the body; for we have demonſtrated that there is no coagulation of the blood, which it has been ſuppoſed to reſolve, or if there was, we cannot conceive how the moiſt heat could remove or take it away.

When we are poſſeſſed of thoſe ſtimuli, wherefore is labour waſted on thoſe remedies that are partial in their operation? Time is infinitely precious, a moment may determine life or death. However, while we are applying theſe general remedies, it were not improper to make trial of ſome of the leſſer ſtimuli, ſuch as friction, pricking, ſcarification, the agitation of the body, light and ſound, the immiſſion of a warm and penetrating humour into the ventricle and the anus.

TRANSFUSION.

It appears from repeated experiments, that the heart is incited to more vehement action by an immiſſion of very gentle humors into the cavities, than by the moſt pungent acids applied to it without or externally. Therefore, after all other remedies have been in vain tried, or found inefficacious, would it not be adviſeable to transfuſe into the interior of the veſſels of the body to be reſuſuſcitated, ſome warm blood or other gently ſtimulating humor.—Let the danger to be apprehended from ſuch a remedy be weighed with the perilous conſequences of the malady itſelf, and the advantages it may produce. If the latter be found to preponderate, it is not only lawful for the Phyſician, but incumbent on him, to venture with even ſomewhat of temerity, to ſave that, which muſt, otherwiſe, be irrecoverably loſt.

INTRANDUM EST IN NATURAM & PENITUS,
QUID EA POSTULAT, PERVIDENDUM.

ERRATA:

P. 3, l. 30, for Leipothymia, read Lipothymia.
P. 9, l. 13, for phlyctænæ, read phlyctanæ.
P. 11, l. 7, for imbecillity, read imbecility.
P. 14, l. 12, for liquidelement, read liquid element.
P. 16, l. 26, for ventrical, read ventricle.